THE ROYAL AERONAUTICAL SOCIETY

MONTHLY NOTICES,

OCTOBER, 1942.

Reduction in Subscriptions.

For some months the JOURNAL has carried a notice drawing attention to the severe shortage of the supply of paper and asking those members who can otherwise see the JOURNAL, apart from the copy to which they are entitled, should consider giving up their copy for the period of the war. The notice added that if a sufficient response was received to the suggestion it would not only have the effect of enabling the JOURNAL to keep closely to the standard it has set, but might have the further effect of enabling some reduction to be made in the subscriptions of those who had helped by giving up their JOURNAL for the war period.

The Council, at their last meeting, reviewed the response to their suggestion and have decided to reduce the 1943 subscriptions of those Fellows, Associate Fellows, Graduates, Companions and Founder Members by 10s. 6d. who give up their JOURNAL for the year. The low subscription at present paid by Students does not permit any reduction to be made. Associates who do not wish to receive the JOURNAL will receive the reduction already laid down in the Rules. A postcard is enclosed in this copy of the JOURNAL for the use of members.

All those members who have already relinquished their JOURNAL and others who do so before Monday, December 14th, 1942, will be notified of the reduction in their subscriptions due on January 1st, 1943.

Graduates' and Students' Section.

Members of the Graduates' and Students' Section are invited to the following lectures arranged by the Graduates' Section of the Institution of Automobile Engineers, 12, Hobart Place, London, S.W.1 :—

Sunday, October 11th, 1942, 3 p.m.—Talk by Mr. Leslie Hounsfield on his recent paper, "A Post War Motor Vehicle."

Sunday, November 15th, 1942, 2.30 p.m.—Talk by Mr. J. Jack on "The Development of the Cross Engine."

Sunday, December 13th, 1942, 2.30 p.m.—Two short papers by Mr. K. B. Hopfinger on "Synthetic Petrol" and "Timber as a Gas Producer Fuel."

Election of Members.

Associate Fellows.—Harry George Sydney Peacock (from Graduate), Henry George Radlett (from Student), Robert Ross Tant.

Associates.—John Robert Abbs, Edgell Conyngham Ivor George Cockburn-Dickinson, Kenneth George Drury, Herbert Gill-Gordon, Alfred Harold Jobling, Jack Voyna Leslie Kemp (from Student), Frank Matthew Liversidge, Edwin Harry Loveless, Robert Gavin McCoy, Robert William Mitcheson, Geoffrey William Morton, Arthur Bert Oram, Frank Edgar Page, Arthur Joseph Somerville, Charles Woodcock.

Graduates.—George Joseph Carayan, Henry Llewellyn Hackforth, Stanley Peter Hawes, Anthony Derek Ruscoe (from Student).

Students.—Frank Ashton, Ian David Kitson, Dennis James Moore, Peter George Sargent, Curt Bernd Alex Schiff, Arthur Ramsay Alexander Wood.

Additions to the Library.

Pamphlets in italics with location reference following in brackets.
Books marked * or ** may not be taken out on loan.

A.c.13.—Inchley's Theory of Heat Engines. (5th Ed.) Revised and edited by H. Wright Baker. Longmans, Green. 1942. 16/-.

B.a.271.—*The Lee-Richards Annular Monoplane*, 1910-1914. *By E. C. Gordon-England. Article in "The Engineer,"* 4/6/37. (Y.3.i.L.)

B.e.40.—Scale Plans of Military Aircraft. By Staff of "The Aero-Modeller." Harborough Publishing Co. 1942. 4/6.

**B.f.83.—Pencil sketches illustrating the Soaring Flight of Birds. By Patrick Y. Alexander. (Undated, about 1890.)

**C.c.60.—Balloon Telegrams. (Forms for dropping from a Balloon, with instructions in several languages to the Finder. Undated, beginning of 20th century.)

D.a.C.14-18.—Civil Aviation in Canada. Official Annual Reports, 1936-1940 inclusive. Dept. of Trade and Commerce, Ottawa.

D.b.178.—*Commercial Air Transport Statistics*, 1935. (*Pages from "Keesings Contemporary Archives," Nos* 290-300.) (Y.6.a.19a.)

D.b.179.—*Aviation in the Post-War Years. By W. Wakefield Adam. Article in "Export," April*, 1942. (Y.6.a.32.)

E.c.26 and 27.—Strength of Materials. By S. Timoshenko. Part 1, Elementary; Part 2, Advanced. Macmillan and Co. 1941. 25/- each part.

EE.a.85.—Armstrong Siddeley Tiger VIII Instruction Book. (A.S. No. 16.) Armstrong Siddeley Motors, Ltd. (Undated, amendments to 1939.)

EE.c.64 and 65.—Aero Engines. By D. Hay Surgeoner. Longmans, Green. 1942. 3/6. (Two copies.)

*G.b.3 and 4.—*British Standards Institution: Standards.* 1942. 1/- *each.*

2L.33. Silicon Aluminium Alloy Castings.

2T.35. 35-ton Steel Tubes (Suitable for Welding).

3T.1. 35-ton Steel Tubes.

2T.45. 45-ton Steel Tubes (suitable for Welding).

2T.50. 50-ton Steel Tubes.

Sectional List of British Standards (Aircraft Materials and Components), August 1st, 1942.

Amendments to Standards Nos. 2L.4, 2L.16, 2L.17, 2L.37, 2L.38, L.44, L.46.

G.e.A.80.—*Northern Aluminium Co.: Research and Development Bulletin (Sept.*, 1942):—

Anodic, Chemical and Paint Finishes for Aluminium and its Alloys.

I.c.18.—Fourier Series and Boundary Value Problems. By R. V. Churchill. McGraw Hill. 1941. 17/6.

J.g.193.—*Bibliography of Ice Accretion. (Handwritten MS., dated* 1937.) (Y.14.a.19a.)

L.b.39.—*Aeroplanes and How They Fly. (Anon.) Longmans, Green.* 1942. 1/-. (PL.1.a.5.)

L.d.76 and 77.—Introduction to Sea and Air Navigation. By W. M. Smart. Longmans, Green. 1942. 3/6. (Two copies.)

**L.h.58.—Aerodrome-to-Aerodrome Aviation Maps. By E. Hollacombe Clift. George Philp and Sons. 1918.

*Q.a.144.—A Bibliography of Aviation Medicine. By E. C. Hoff and J. F. Fulton. Chas. C. Thomas, Illinois. (Baillière, Tindall and Cox, London.) 1942. Price $4 (in England, 22/6).

Q.d.53.—*Attack and Defence. (Unarmed Combat in Pictures). By R. Horn and Others. Longmans, Green.* 1942. 1/6. (PQ.1.b.13.)

**R.b.233.—*Two letters written by Mr. Patrick Alexander to Mr. Griffith Brewer re Ballooning.* (1891 and 1893 respectively.)

R.e.50.—*Air Prophecies and Projects. (Discussion of the work of Mr. G. L. O. Davidson, reprinted from Aberdeen Press and Journal,* 27/4/29.) (Y.11.4.a.9a.)

R.f.80.—Great Flights. By E. Colston Shepherd. A. and C. Black. 1939. 7/6.

RR.116.—Cours d'Aviation Pratique. By A. Courquin and G. Serre. Gauthier-Villars, Paris. 1920.

S.d.78.—History of Combat Airplanes. By C. G. Grey. Norwich University, Vermont, U.S.A. 1942.

S.e.45.—Flight to Arras. By A. de Saint-Exupéry. Heinemann. 1942. 7/6.

S.e.46.—Bomber Command Continues. Ministry of Information. H.M.S.O., 1942. 7d.

S.e.47.—Victory through Air Power. By Major A. Seversky. Hutchinson and Co. 1942. 9/6.

**S.e.48.—Canada's War in the Air. By Leslie Roberts. A. M. Beatty, Montreal. 1942.

T.b.80.—Around the World in Eight Days. By Wiley Post and H. Gatty. John Hamilton. 1932.

*UU.c.—*National Advisory Committee for Aeronautics, U.S.A.: Technical Memoranda*:—

No. 1001. The Design of Propeller Blade Roots. By G. Cordes. (From Luftfahrtforschung, April, 1941.)

No. 1006. Electrical Equipment for the Experimental Study of the Dynamics of Fluids. By Carlo Ferrari. (From Proceedings of Società Italiana per il Progresso delle Scienze, 1938.)

No. 1023. Two-Dimensional Potential Flow past an ordinary thick Wing Profile. By F. Keune. (From Jahrbuch 1938 der deutschen Luftfahrtforschung.)

No. 1024. Thermal Theory of Combustion and Explosion. By N. M. Semenov. (From Progress of Physical Science, U.S.S.R., Vol. 23, No. 3, 1940.)

*V.13/4.—*Proceedings of 2nd Annual Meeting of the Society of Weight Engineers, U.S.A., April,* 1942. (Y.34/5.)

J. LAURENCE PRITCHARD, *Secretary and Editor.*

AD ASTRA

BY

THE RT. HON. LORD BRABAZON OF TARA, M.C., P.C., F.R.AE.S.,
VICE-PRESIDENT AND FELLOW OF THE SOCIETY.

THIRTIETH WILBUR WRIGHT MEMORIAL LECTURE.

The Thirtieth Wilbur Wright Memorial Lecture was delivered before the Society on Thursday, May 28th, 1942, at 6.30 p.m., in the Lecture Hall of the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, by permission of the Council of the Institution. The chair was taken by Mr. Griffith Brewer, Hon. F.R.Ae.S., President of the Society.

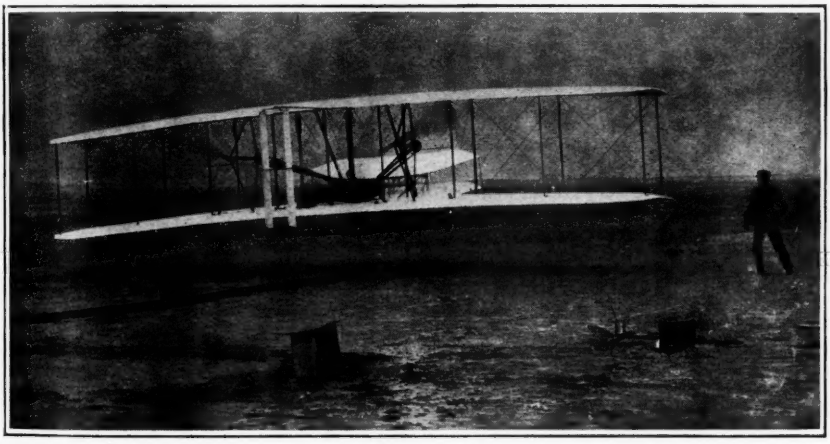

FIG. 1.

The first controlled and sustained flight, December 17, 1903, Orville Wright piloting the machine; Wilbur Wright on foot.

The PRESIDENT: Thirty years ago Sir Horace Darwin delivered the first Wilbur Wright Memorial Lecture. Every year since then a Wilbur Wright Memorial Lecture has been delivered before the Royal Aeronautical Society. After the first five lectures it became the custom for an American to deliver the lecture one year and an Englishman the next.

In 1920 Commander Hunsaker of the United States Navy delivered the 8th Wilbur Wright Lecture and the Society was honoured by His Majesty King George, when he was Duke of York, taking the chair. In introducing the lecturer the Duke drew attention to the good feeling and co-operation between the United States and ourselves, when the American Government authorised Commander Hunsaker to publish in the official organ of the Royal Aeronautical Society, information of extreme importance to designers imparted for the first

time. He said that the co-operation and good feeling between our two nations which developed during the war must never be lost.

The suggestion of co-operation was not followed at that time, but it has now been resumed by the free exchange of aeronautical knowledge which is taking place between the American and British authorities.

A few days ago I sent Mr. Orville Wright the following cable:—

> "On May 28th Lord Brabazon, British Pilot No. 1, will deliver the 30th Wilbur Wright Memorial Lecture before the Royal Aeronautical Society, entitled 'Ad Astra.' He will advocate a world control by the United Nations of aircraft for peace development and for ending for ever their use for aggression. Would greatly appreciate your views on this. My Council and all members send you their most cordial greetings on this occasion."

This is his reply:—

> "Please extend my greetings to Lord Brabazon and the Members of the Society. These are unhappy days, but if this war leads to universal disarmament and to a world-wide league to police and enforce the maintenance of disarmament, I believe these unhappy days will not have been in vain."

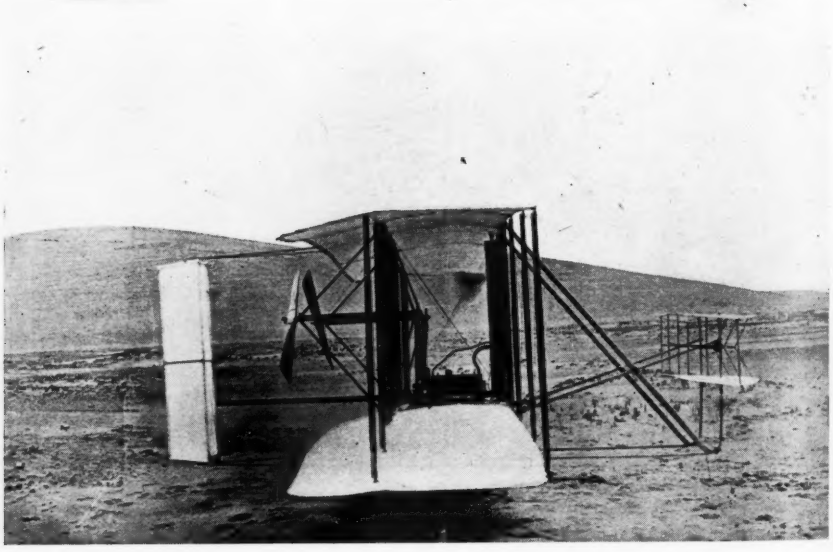

FIG. 2.

Side view of the Wright machine at Kitty Hawk, December 17th, 1903.

Lord Brabazon, who is the lecturer this evening, is one of our oldest friends. I have known him ever since his youth when, as the youngest member of the Royal Aero Club Committee, he flew against me in many international balloon races. I stood with him in the car of his balloon in 1906 when he flew for his balloon pilot certificate. Later, when Wilbur Wright came to Europe and demonstrated that the flying era had arrived, the lecturer of the evening forsook the balloon for the aeroplane and won the Certificate No. 1 for being the first Englishman to fly in England. Since then he has gone from strength to strength (including the office of Minister of Aircraft Production) until we see him raised

to the Peerage, and now the honour of delivering the Wilbur Wright Lecture crowns his career.

I will now call on Lord Brabazon to deliver the 30th Wilbur Wright Lecture.

AD ASTRA,

By the Rt. Hon. Lord BRABAZON OF TARA, M.C., P.C., F.R.Ae.S.,
Vice-President of the Society.

I want first of all to pay my very sincere thanks to the Council of the Royal Aeronautical Society for having invited me to give the Wilbur Wright Memorial Lecture. It is a high honour to be chosen, and I have derived pleasure and instruction from listening to, I think, nearly all of them.

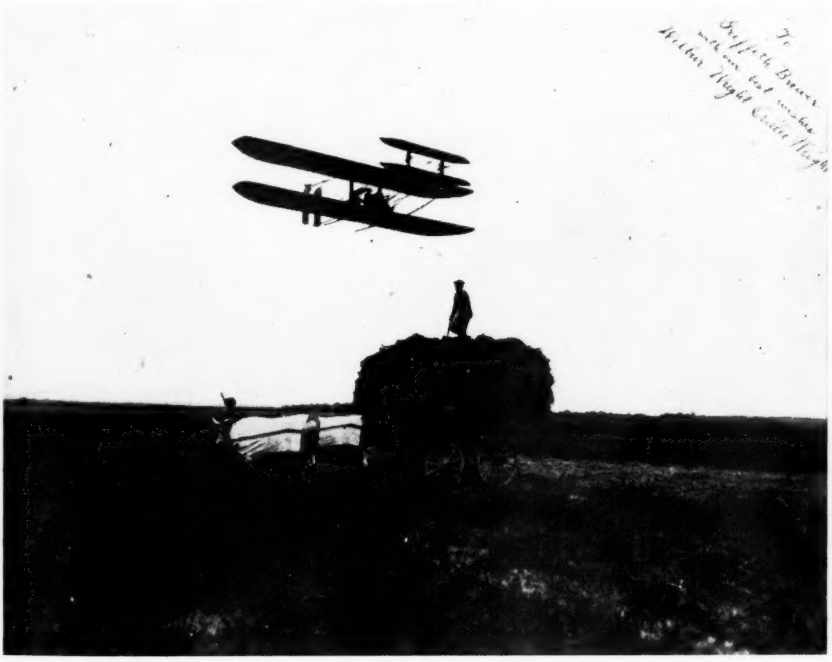

FIG. 3.
Wilbur Wright flying cross-country in France.

The time is arriving, however, when those selected will be of such tender years, I speak of course comparatively, as not to have known the Wright era. I go back to those days, and in that I do, I think the incredulity as to the possibility of flight in those days is not now sufficiently appreciated. Anyone experimenting was dubbed a crank rather like someone seeking perpetual motion, amiable but still a lunatic. The United States Patent Office, until the Wrights demonstrated their gliding ability, was chary of all applications for patents concerning flying machines, classing them with perpetual motion and the philosopher's stone. " Pigs might fly " was the height of impossibility, till I

had the honour and privilege myself of taking one up. No more distinguished passenger was ever given a flight as it turned the impossible into the possible. The *Daily Mail* that offered a prize of £10,000 for the first flight from London to Manchester, met with a torrent of ridicule from all its contemporaries.

Gliding there had been. The growing efficiency of angles of glide had not been appreciated by engineers as showing a diminishing demand for horse-power that would ensure sustained flight. If steam had had to be relied upon as a prime mover, the conquest of the air would have been delayed, but the Wright brothers would have produced a suitable engine themselves, like perhaps the heroic engine by Maxim, as that was the stuff of which they were made. Flight

FIG. 4.

Wilbur and Orville Wright with Griffith Brewer, Professor Huntingdon, J. T. C. Moore-Brabazon, and others, at Shell Beach, May 4th, 1908.

was, however, the child of the internal combustion engine, but even here the Wrights made their own—a very remarkable achievement.

Their patent strikes one as odd to-day. Their claim was that lateral stability could not be effected without a modicum of control on movement of the aircraft about a vertical axis. Whether stabilising trailing planes would have voided the patent, it is now useless to discuss, because the Wrights' English friends who formed the British Wright Company, Ltd., which owned the Patent sold the military use to the British Government and freed the Civil use for the British aircraft industry.

Between 1903 and 1908 there was singularly little news of what the Wright brothers were doing. O. Chanute, however, read a paper on " Recent Aero-

nautical Progress in the United States," afterwards published in the AERONAUTICAL JOURNAL in July, 1908, in which he said:—

> "Yet it is now generally conceded that they have accomplished all they claimed, *i.e.*, to have made a first dynamic flight in 1903, to have mastered circular courses in 1904, making 105 flights, the longest of which was three miles, and to have obtained control of their apparatus in 1905, making 49 flights, the longest of which was 24 miles, consisting of 30 sweeps over a circular course at an average speed of 38 miles an hour."

The paper was thrown open to discussion, but no one spoke!

Those of us who remember the early efforts, will always treasure the recollection of the two brothers Wright. They were not Mr. Know-alls, they were bashful, retiring, nervous almost, but yet with strong independent natures that—to use a servantism—"kept themselves to themselves." It was not easy to get to know them. No sensation monger or lion hunter got very far, but if you were really interested and had faith, slowly there would open up to you, people who the more you got to know, the more you had to love. There never could be anything mean about them, they were and remained simple students and pure of heart. It is one of the proud events of my life that I knew Wilbur and counted him a friend, and I hope if Orville reads this paper, he will accept from a disciple, my reverence, duty and affection.

They were Americans to the tips of their fingers. I think outside their country they found here such sympathy and admiration, as nowhere else, and the fact that their first machine is normally in our Science Museum testifies to the friendliness in their hearts. They were fortunate also in having as a friend and admirer on this side, our present President, Mr. Griffith Brewer. The partnership between the two brothers was amusingly and graphically demonstrated at a dinner in Paris where Mr. Michelin, after a suitable speech, presented Wilbur with the prize that they had earned of 20,000 francs. Wilbur expressed his thanks, carefully divided the notes into two packets, and without a word handed over one packet to his brother, the while he put the other in his own pocket!

All this sounds so very long ago, but it is only 30 years. I played a small part in those early days, of which I am proud, by winning a prize of £1,000 given by the *Daily Mail* for the first flight of a circular mile on an all English machine, the first British Empire Michelin Cup and by being the first to qualify for the Royal Aero Club's flying certificate. But why I stand before you to-night is that, although never wholly a technician, I have been in touch ever since, occupying such posts as President of the Royal Aeronautical Society and Chairman of the Royal Aero Club, and have been a consistent advocate of air power in the House of Commons. I sometimes wish I had taken up, like some of my old friends the manufacture of aircraft, at least now, I would have come into my own, but only after long years of travail. Most of them had little idea as to the size and importance that the industry would become, but I refuse to allow them to be dubbed by the ignorant armament makers. If to-day they make armaments it is by accident, not by design. The country would be to-day in a very parlous state if it had not been for the self-sacrificing efforts of men with the pioneering spirit, who backed up their faith with their own worldly goods by making aeroplanes in lean times. If it had been left to the State there would not have been any industry at all upon which to build the great output of to-day.

I intend to give expression to some thoughts and recollections in three main groups, first of all from the political angle, then war use, and finally reorganisation after the war.

1. POLITICAL.

At the end of the last war in 1918 we found ourselves completely and supremely masters of the air. So well equipped were we in our Army Co-operation that we had spare capacity to start the luxury of an Independent Air Force, as it was

then called. Such was the ineptitude of the powers that be, and of the people in general of this country—as they made no protest—that within a few short years we had thrown our hard won position overboard as if we were ashamed of it. Instead of grasping to us this new power, all that occurred was a protracted and bitter struggle by the two older Services to split up the newly formed Royal Air Force into two parts and re-absorb them.

The while this went on as an inter-departmental war—and a world war is child's play for real bitterness beside a government inter-departmental war—all real interest in Air affairs completely evaporated. Year after year I have seen the Air Estimates discussed with no more than a dozen members present in the House of Commons, and with no interest displayed by the House, by the country or the Press. I think in a review of the situation it would be but justice to mention the names of the honourable exceptions, for they at least were not to blame for our lack of preparedness. There was Lord Hugh Cecil, a very skilled debater; Wedgwood Benn; Kenworthy; Murray-Sueter and Lord Curzon. For all the effect our debates had, we might have saved parliamentary time by having a private dinner! So enraged was I once, that they would not even put the Air Minister in the Cabinet or let us debate defence as one problem, that I gave vent to the words: "The snores of the government resound throughout the country." It was played up well against me, and I lost my seat because of it, but I never regretted saying it.

I think I am speaking the accurate truth when I say that those who were responsible for the birth of flight, thought of it as a new force in the world for peace, for prosperity and for true internationalism. Here was to come something which would make the world a happier place by a quick form of transport, that would bring us all closer together. It was for that idea that I saw my friends pour out their meagre fortunes in experiment, and risk their splendid lives in brave endeavour. I contend that the crushed shapeless or charred embers of so many victims were well sacrificed, if they were to bring about such ideals. But mechanical science outstrips human wisdom, till we find we have created a juggernaut that may indeed destroy us. I want it clearly realised that if to-day flight bears the brand of Cain, it is not on the pioneers that the blame should be laid, but on foolish politicians of many countries.

Holt Thomas must bear an honoured name in trying to use war aircraft for civil purposes, with resultant commercial disaster. The Government stepped in with half hearted support to an enterprise which meant so much to a far-flung empire, but so lacking was vision, that the only thing ever indulged in was puny assistance to civil aviation and on the military side the provision of a few squadrons of aircraft, always at least seven years out of date by the machinery of Air Ministry procedure.

The while Governments were striving after war machines it was left to keen competition in civil aviation in America, to bring about the first real advance in civil flying. The Douglas is so well known to you all here as not to warrant description, but it did promise that at long last the civil side of flying was going to go along a separate path in development, and would become divorced from military development. It was later found that as a military bomber the commercial machine was superior to all government produced machines. Tragic as this was to myself and to many others, let it be taken to heart by those who think that a real progressive development can be got from government controlled establishments in whatever country they may exist.

The Air Ministry for years looked upon Civil Aviation as a sort of Cinderella to be kept in the background, but they still retained a sort of dog in the manger attitude and would not allow anybody else to get on with the job. I and others repeatedly tried to get Civil Aviation put under another Ministry, such as Transport or the Board of Trade. I see in the First Gorell Report on Civil Aviation of 1934, a minority reservation that was signed by Mr. Gordon England and myself which said, amongst other remarks well worth reading, the following:—

> " We look upon it as imperative that the whole of Civil Aviation be taken away immediately from all connection with the Air Ministry, and placed, like other normal forms of transport, under an appropriate Minister, divorced entirely from the war complex, preferably the Minister of Transport."

But all we got were lectures from Ministers of the time of a very unconvincing type.

I hope that having given the regrettable facts of the last twenty years in the realm of Parliament, it will not be thought that I am belabouring a particular party which was in power. Not at all, for if anything the Opposition were even more lethargic, resisting all expenditure and failing to use material, that might have been well exploited by an imaginative Opposition.

2. War.

The competition on supply between the Army and the Navy in the last war clearly showed that it was an unwise thing to allow two Services to compete against each other for machines in an industry, which was none too big for national requirements. Thus was formed the Air Board, which looked after the supply side. Eventually came the Independent Air Force commanded by that colossal figure, Lord Trenchard. From that it was but a step to a new Service to be called the Royal Air Force. I have referred to the dismay of the older Services that air should be taken away from them and the departmental fights on this subject. I confess that I was a strong partisan of the new Service and fought all I could for it. I thought that to divide our slender resources into two or even three was not to use the air power that we had to its maximum, if separated batches of machines would be so to speak earmarked to one particular job and not be swung about as should be done, if advantage was to be taken of the mobility of aircraft in general.

I suppose that one should have seen further and seen grow up a set of men that thought that air was so supreme that alone by its aid wars could be won—people who only thought in terms of air to air and never of air to ground. Some have called this the " Trenchard School." It is nothing of the sort. The Trenchard School was " never to bomb the front line to-day if you could bomb the back line yesterday." That was an efficacious policy and less costly in machines. I am a believer in the Trenchard School under the circumstances of fixed lines as was the fashion in the last war.

The position of air organisation to-day is not really inspiring. First of all there is the Navy. No one will deny that anyhow the old school are battleship minded, and in peace time feared nothing from the air. Now from bitter experience they call more and more for air support. Certainly you can improvise up to a point, and it is being done, but earlier clearer thinking would have produced really suitable equipment now.

The situation in the Army is that they have no policy at all, no equipment and no technicians. They work on the charity of the Air Force who co-operate with them. Nobly do they rally round. But in that the Army do not think in terms of the application of air power to new tactical operations, so no new weapons are produced. Such weapons are long overdue, but who is to inspire them and get them built, I do not know.

Lastly there is the Air Force. Here their policy is twofold:—

(1) So to equip the country with efficient fighters as to defeat any air inspired invasion;

(2) To bomb Germany into submission.

Thus they take upon themselves the whole winning of the war. True, the first task—defence—they have done well and truly, but the second can never be done by air alone. Granted concentrated bombing over enemy soil may have a great moral, psychological and material effect, yet all is discounted if by lack of air support in other fields of war, we experience reverses. Here indeed is the essence

of the problem. Operations wherever they occur must be afforded as a first charge overwhelming air support, before air attack alone—away from such theatres—can be indulged in. Bombing by itself is a luxury, and only an efficient weapon, if done, with air power, surplus to that necessary for the military operations of the time.

Some of our defeats would never have occurred if the then Forces existing had been differently distributed, instead of concentrated on luxury bombing of Germany. A concentration of long range bombers, of great weight carrying capabilities and range, in the Eastern Archipelago, would and should have had a very salutary effect on the numerous expeditionary forces that are being indulged in by Japan.

Fighter sweeps, although in accordance with the idea of air winning the war on its own, are costly in machines, and had the losses been avoided and the numbers taken to the real danger spots we might indeed have avoided some unpleasant reverses.

On the other side I am not in favour at all of the German system in which everything is subordinated to the Army. The dive bomber, for instance, is a very valuable weapon for an advance by troops well supported by tanks, and under an umbrella of fighters, but it is a poor sort of business bomber. It was the lack of real bombers that was the reason for their failure against us in the Battle of Britain. True, on the shores of Dunkirk our troops very seldom saw an English machine, but it was for the good reason that they were well inland stopping enemy dive bombers ever getting to the beaches.

Had Germany had really efficient bombers at that time the attack on our troops on the shores of France would have been devastating. Here the boot is on the other leg, and we see the disadvantage of swinging too much away from our R.A.F. independence of the other Services. It will be interesting to see how the American organisation works out. Here there is no separate air force, as such, but the Army side seems conscious of its air rôle in the war independent of ground troops.

I pleaded years ago in the House of Commons for one Service only. The advent of air power has brought them all together. I was laughed at, at the time, and there was even a picture in *Punch* of me dressed in a combination of all the Services. But the conception is right and it is the only way to look at the great problems of war at the present time. I don't say, as our forefathers did, that a General should command a fleet, but I do say there is more difference between a cavalry trooper and a tank private both in the Army, than between a first class artificer in the Navy and an air mechanic in the Air Force.

All wars are prepared for on the basis that they are going to be like the last one, and they never are. That should be taken to heart by all professional fighting men yet how invariably it is forgotten.

There is also a point on the psychological side that I would like to bring out. Because Air is the latest of the Services and is looked upon as—so to speak—progressive, one would imagine that within its personnel you would find go-ahead imaginative people jostling each other about. I find no such thing. Rather is the picture one of contentment and satisfaction with the existing position, and great resentment is shown when criticism is directed against a state of affairs that they consider the most perfect in the most perfect of all possible worlds.

It would scarcely be right or proper not to draw attention to what was in fact the first great air battle on a large scale in history—the Battle of Britain. The planning of the defence, the technical equipment, the machines, the training of the pilots, all that happened to save us from irretrievable defeat, when we stood alone in the world against Germany, was due to those at the Air Ministry. We still have the right and privilege in this country of criticism, but because of it, we are equally behoven to pay honour where honour is due. And to the Air Force we pay tribute for being wholly responsible for one of the great decisive

battles of the world. The destruction of 2,375 enemy machines between 8th August and 31st October put the possibilities of immediate invasion of this country out of the question.

3. Post War.

It has been said by many, and there is much truth in it, that it would be better for us to win the war first before we think and plan for post war situations. This is one of those half truths that are so very dangerous, leading one really astray. The Germans are fighting for a post war position. We are fighting to resist the imposition upon us and others of an intolerable post war bondage. Surely, therefore, we both have in our minds the whole time a post war position. If that is so there is nothing to be ashamed about or to find deplorable in supposing victory, and to allow one's mind to browse over some of the ameliorations that we should like to see introduced into our beloved country.

On the social side we all have views as to many things we do not want to see exist again, and many new ideas we should like to see introduced. But this is a paper on Aviation, consequently although I would like to widen the scope into many theatres, I must confine myself to the Aviation aspect.

Do not think, however, that is unimportant. Far from it, for I think much human happiness and perpetual peace could and should result from a really sound planning of post war flying.

I have touched briefly on the early struggles of flight. When this had not got very far there came the first World War. Into that effort there was a tremendous concentration on aviation. For the first time all the efforts of engineers and scientists were concentrated on the subject with, moreover, unlimited money behind it. It was a mushroom growth not entirely on healthy lines. Field of fire, manœuvrability, lack of blind spots, rate of climb were all points of first importance. Such things as pay load, initial expense, inherent stability, economy of fuel consumption, lack of danger from fire: all those really basic matters that would have come into normal development of a new form of transport, were passed by and we were left at the end with certainly a very wonderful advance, but one upon which debate may still rage as to whether the quick growth really helped the science along or retarded it.

I have shown that Holt Thomas, trying to use war machines for civil purposes, found that it was an impossibility, so detached form an economic machine had the aeroplane become. Many of us hoped and prayed that a very real divergence would come about between the military type and the civil type. This was not to be, however, anywhere except in America, where free competition developed in a country of astronomical distances, which was made for flying development.

All Governments, almost without exception, put their clammy hands upon the aeroplane and said that the State would do this and not allow that. They always saw through a sort of fog also that they must regretfully have at their disposal a nucleus of private firms making aircraft against the necessity of another war.

Civil aviation was born too soon from the bowels of the war and was mis-shapen from the start, so that it could not, till completely reorganised from a design point of view, *fly by itself*. A vicious circle ensued, therefore, wherein firms wanted to make a civil machine, but as air transport could not pay there were no buyers, and as they had to keep alive they continued making machines that were suitable for war purposes only. Slowly the industry became the tools of the air bureaucracy of their country who dictated to them what to make. With a lip service to disarmament, actually to keep alive an industry for war, state subsidies started up and down the world nominally to keep flying services going. Take the case, just as an example, of engine development. In all other forms of transport the C.I. or Diesel engine has displaced the petrol engine, for economy in the case of ships and for the buses of London. Notice it was adopted here not entirely for reasons of safety. But in an aeroplane the safety reason was

of paramount importance. The statement that I have had given to me, that fire did not matter as most people were killed before they were burnt, is a travesty of the truth, as an aeroplane is never in more danger than when it is not going very fast and is in contact with the ground. Yet did a C.I. engine emerge? No. For this reason: Governments were not interested in it, as it showed no great advantage for war and therefore the manufacturer had no market in which to sell his product if the state run air service was not going to encourage such a thing.

Thus history shows that the birth of flight was of clean parents; but due to the first World War it was branded with the mark of Cain and ever since it has been tied to the apron strings of Mars. It is a sorry story, and although here and there I and others can point to some cases of honourable endeavour to get away from the position I have described, I think that most fair minded people will agree that what I have said is the truth.

The point I am getting at is this. Is there to be such lack of imagination, such supineness, shown in the world again? I feel it only right that we should consider this problem while we are under stress and strife, and plan and arrange the future. Otherwise I know that it will pass to a tired and poor post war world with little energy or imagination, only wanting to be left alone to lick its wounds.

I take it first of all as axiomatic, that those nations that have fought together and suffered together, and won together, are going to remain friends and work together. What is curious, however, is that most of these nations are above all, nations that are concerned with very long distances as the basis of communication. I suggest that the U.S., the U.S.S.R. and ourselves, with the United Nations, should announce that henceforth they jointly and solely take charge of all aircraft and all flying, that the " Usque ad Coelum "* doctrine goes and that in future they give themselves the right to fly whithersoever they like, and that no one anywhere on earth shall fly without their consent. Thus there will be a watching force to see that nowhere in the world shall a nation secretly build up an air force for mischief. This combination will be the start of a Kipling's A.B.C. It would, of course, delegate to countries their own internal organisation for local flying, but always under its broad control. But the great long distance highways will be in their charge and run by international crews. They will at first operate war machines for intercommunication till better are made by the industry existing, which cannot be dissolved overnight. In return for taking upon itself these great powers, the World Board will guarantee all states against aggression and will constitute to itself the policing of the world. Where we make a difference from the League of Nations idea is that here we will be creating, right at the beginning, a force of transcending power that no one can challenge, instead of a debating chamber that had no force at its command. I do not for one moment lay it down that at the right time our present enemies should not come into the general scheme. The idea is world co-operation and not penalisation. It is high time, with the resources at our command that we protected ourselves against a world war every generation. And here in our hands we have the instrument so to do.

A world-wide development of civil flying would have great repercussions on human life and materially improve the standard of living. The exploitation of this great invention to be put to the use of man rather than his destruction is long overdue. The world shrinks in size as time separation diminishes. Mails and passengers would be the first to be served, movement of heavy goods for some time remaining in the hands of the older systems of transportation. What the world holds for us in tariff barriers in the future we do not know, but it is to be hoped that an easier, freer circulation of travellers to and from all countries will be encouraged rather than at present frowned upon by a narrow spirit of nationalism. There are also great tracts of land, rich and climatically possible, waiting to provide a happy life for many, who at present due to lack of com-

* Ownership of air above any particular piece of ground.

munications cannot live there with their kith and kin. With flight our servant, there should be no corner of the earth not readily accessible.

You may say this is post war planning with a vengeance. To which I reply that there is no one fighting on any front who has not in his heart the idea of a fairer world afterwards where his children, and for a time he himself, can go about his lawful occasions.

We in this country have seen a revolution take place peacefully in our land over the last twenty years. There is much more to be done. But no amount of planning our lives and our social progress can be of value or be permanent unless we see clearly and appreciate the potential danger that man has created through the conquest of the air, and so organise the future that it is no longer a threat, but becomes the servant of man.

To finish the job we have in hand and then to drift into a fools' paradise would be a tragedy little worthy of the efforts we have made to remain masters of our own destiny. This plan, which I put forward in a very broad way, is an appeal, not just to the scientific world, but to all social reformers and to those who love their country, whether they belong to a great one or a small one.

We are all going to be in danger again, unless we co-operate immediately to see that although we are far from the Kingdom of God, there is at least the possibility of a Kingdom of Man, and of a United Kingdom.

Sir Roy Fedden, Fellow of the Society and Immediate Past-President: I feel it is a privilege, as well as a great pleasure, to be allowed to propose a Vote of Thanks to our Lecturer this evening, Lieut.-Colonel the Rt. Hon. Lord Brabazon.

I think there can be no one more fitted than Lord Brabazon to deliver the Wilbur Wright Memorial Lecture, which is the most important annual event of the Society and was instituted to commemorate the pioneer work of the Wright Brothers, as he is himself holder of the First Flying Certificate granted by the Royal Aero Club of Great Britain.

His personal achievements in the field of aviation, and his record of service to the country, are well known to you and have been referred to by our President.

His association with the Society has been of long standing. He was president in 1935, and has rendered invaluable service for many years on the Council.

Throughout his long career of achievement in all branches of sport, no matter whether flying, motor car racing, or sailing, he has always taken an intense interest in new developments and pioneer work.

I well remember the occasion when he won distinction in the Circuit des Ardennes in, I believe, 1910, at the wheel of a large Minerva with sleeve valve motor.

It is a happy coincidence that at the time when the interests of Great Britain and America are daily becoming closer and more interwoven, that Lord Brabazon, fresh from his labours as Minister of Aircraft Production, should have been chosen for this rôle to-night, thus knitting closer the ties between our two nations, which will ultimately restore peace and bring about a new order throughout the world.

The Atlantic Charter is no mere phrase or pious hope. Its fulfilment is, and must be, the endeavour of every American and British citizen; and it would be an enthralling study to trace the part which aviation alone has contributed, and will contribute, to this end.

To-day, American aircraft are coming across the Atlantic Ocean to the aid of the Allies in increasing numbers, and on such an occasion as this we cannot fail to remind ourselves with thankfulness of the pioneer work which has made this possible, and which we hope will prove to be the beginning of the realisation of our joint endeavours.

The arrival was announced in the Press this week of the heads of the two Air Arms of the United States—General Arnold and Admiral Towers—to consult

on Anglo-American military co-operation, and I notice that General Arnold is also one of the first military pilots in the United States and received his tuition from the Wright Brothers.

Admiral Towers was the sponsor for training British cadets at Flying Schools of the United States Naval Air Service.

This is another example of how our joint history in aviation is interwoven and inseparable.

This is the third Wilbur Wright Memorial Lecture to be held during the present hostilities. In the last war we did not miss a single Wilbur Wright Lecture, and it is not our intention to do so in this one.

In conclusion, I feel sure that everyone present here to-night will join with me in thanking Lord Brabazon for a lecture worthy of a great occasion.

We live in difficult times, but intensely interesting ones with immense new vistas in aviation opening out before us. We have undoubtedly some long way still to go, but with complete Anglo-American collaboration, there can be no doubt as to the final results, when we shall see all the work of these pioneers brought to complete fruition and aviation developed to its fullest extent for the purposes for which it was intended.

Dr. H. Roxbee Cox, Fellow of the Society, Deputy Director of Scientific Research: It is a very great pleasure indeed to second the vote of thanks to the Wilbur Wright lecturer so eloquently proposed by Sir Roy Fedden. To-night is a great occasion—the 30th memorial lecture to the Father of modern aviation, delivered by one of its most distinguished sons, the most eminent member of this Society.

When I picture with my mind's eye this Society in session I see the serried ranks of the faithful, numerous and anonymous, I see the lecturer, Mr. X, or Mr. Y, or Mr. Z, or whoever it may be, and right in the middle of the platform I always see Colonel Moore-Brabazon, the most stimulating and enlivening chairman this Society has, in my memory, had. He had a masterly way of dealing with lecturers of all sorts and sizes. He was never daunted even by our most erudite scientists, though on one occasion, the better to grapple with the intricacies of the mathematical argument pouring from the lecturer's lips, I saw him close his eyes. We have got so used to seeing him in the chair that it is almost a shock to see him on the platform in any other seat.

The last part of his lecture to-night has been concerned with civil aviation and the future, matters in which I am personally deeply interested and about which we must think from now on more and more. There is little we can do in the middle of a war for existence, but in the leisure we have occasionally to take we can think and plan together to use aviation as Wilbur Wright knew and hoped it would be used—in the service of humanity.

We can think about the future to-night with more confidence in our visions than we could when I had the honour, exactly two years ago, of giving the first Wilbur Wright Lecture of the war. Two days before that lecture the Belgian Army had capitulated. On the day of the lecture the evacuation from Dunkirk had begun. Such was the background then. The lecture was almost postponed. There was talk of cancelling it, things looked so black. But Mr. Griffith Brewer was convinced that in no circumstances must the Wilbur Wright Lecture, monument to sanity in a mad world, be postponed. He had come back from America a few days before and he saw to it that the 28th Lecture was held on the usual day, at the usual time, in the usual place. The President, at that time Mr. Fedden, had had to go to America just before, so in the chair on that occasion was, naturally, Colonel Moore-Brabazon, who gave an even more than usually brilliant performance.

The atmosphere to-night is very different, significantly so. Then, we held the Wilbur Wright Lecture rather in a mood of defiance; to-night we hold it confidently with no doubts that the plans we make for the future can be brought to life.

This meeting of the Royal Aeronautical Society thanks you, Lord Brabazon, for a lecture at once interesting and inspiring and for its pictures of past, present and future, and Mr. President, I beg leave to second the vote of thanks to the lecturer.

Following the lecture the Annual Council Dinner was held at which the following were present:—

His Excellency the Duke of Alba, G.C.V.O. (the Spanish Ambassador).

Mr. R. Blackburn, O.B.E., A.M.Inst.C.E., M.I.Mech.E., F.R.Ae.S. (Blackburn Aircraft, Ltd., Member of Council).

The Rt. Hon. Lord Brabazon of Tara, M.C., P.C. (Vice-President and Fellow of the Royal Aeronautical Society).

Mr. Griffith Brewer, Hon. F.R.Ae.S. (President of the Royal Aeronautical Society).

Mr. S. Camm, C.B.E., F.R.Ae.S. (Chief Designer, Hawker Aircraft, Ltd.).

Air Marshal Sir Christopher Lloyd Courtney, K.C.B., C.B.E., D.S.O. (Air Member for Supply and Organisation, Air Ministry).

Dr. H. Roxbee Cox, D.I.C., B.Sc., F.R.Ae.S. (Deputy Director of Scientific Research, Member of Council).

Mr. W. C. Devereux, F.R.Ae.S. (High Duty Alloys, Ltd., Vice-President of the Society).

Air Marshal Sir Sholto Douglas, K.C.B., M.C., D.F.C. (Air Officer Commanding in Chief Fighter Command, R.A.F.).

Mr. G. H. Dowty, F.R.Ae.S. (Dowty Equipment, Limited, Member of Council).

Mr. E. C. Gordon England, F.R.Ae.S. (Director, General Aircraft, Limited, Member of Council).

Mr. C. R. Fairey, M.B.E., F.R.Ae.S. (Fairey Aviation, Ltd., a Past-President of the Society).

Sir Roy Fedden, M.B.E., D.Sc., M.I.A.E., M.I.Mech.E., M.S.A.E., F.R.Ae.S. (Chief Engineer, Bristol Aeroplane Co., Ltd., Member of the Council, Past-President of the Society).

Mr. A. Gouge, B.Sc., F.R.Ae.S. (Chief Designer, Short Bros., Ltd., Member of Council).

Major F. B. Halford, M.S.A.E., F.R.Ae.S. (de Havilland Aircraft Co., Ltd., Member of Council).

Mr. W. P. Hildred, O.B.E., M.A. (Director General of Civil Aviation, Air Ministry).

Mr. J. E. Hodgson, Hon. F.R.Ae.S. (Honorary Librarian of the Society).

Captain A. G. Lamplugh, F.R.Ae.S. (British Aviation Insurance Co., Ltd., Member of Council, Honorary Treasurer of the Society).

Air Marshal F. J. Linnell, C.B., O.B.E. (Controller of Research and Development, Ministry of Aircraft Production).

Colonel the Rt. Hon. J. J. Llewellin, C.B.E., M.C., M.P. (Minister of Aircraft Production).

Rear-Admiral A. L. St. G. Lyster (Fifth Sea Lord and Chief of Naval Air Services).

His Excellency Baron de Cartier de Marchienne, B.C.V.O., G.B.E. (the Belgian Ambassador).

Mr. R. K. Pierson, O.B.E., B.Sc., A.M.Inst.C.E., F.R.Ae.S. (Chief Designer, Vickers Armstrong, Ltd., Member of Council).

Captain J. L. Pritchard, Hon. F.R.Ae.S., A.F.I.Ae.S. (Secretary of the Society).

Dr. A. G. Pugsley, A.M.I.Struct.E., A.F.R.Ae.S. (Royal Aircraft Establishment, Member of Council).

Mr. D. R. Pye, C.B., F.R.S., M.A., M.I.Mech.E., F.R.Ae.S. (Director of Scientific Research, Ministry of Aircraft Production, Member of Council).

Mr. E. F. Relf, F.R.S., A.R.C.Sc., F.R.Ae.S. (Superintendent, Aerodynamics Department, National Physical Laboratory, Member of Council).
Mr. N. E. Rowe, B.Sc., A.C.G.I., D.I.C., A.F.R.Ae.S. (Ministry of Aircraft Production, Member of Council).
Lord Sempill, A.F.C., F.R.Ae.S. (a Past-President of the Society).
Air Vice-Marshal R. S. Sorley, O.B.E., D.S.C., D.F.C. (Assistant Chief of Air Staff (T.)).
Major J. P. Sparks (Acting Military Air Attache, United States Embassy).
Air Vice-Marshal E. W. Stedman, O.B.E., A.R.C.Sc., Wh.Sc., M.Inst.C.E., M.E.I.C., F.R.Ae.S. (Royal Canadian Air Force).
Mr. A. Hessell Tiltman, B.Sc., F.R.Ae.S. (Airspeed (1934), Ltd., Member of Council).
Sir Henry Tizard, K.C.B., C.B., A.F.C., F.R.S., F.R.Ae.S. (Ministry of Aircraft Production).
Mr. C. C. Walker, A.M.Inst.C.E., F.R.Ae.S. (Chief Engineer, de Havilland Aircraft Co., Ltd., Member of Council).
Dr. H. C. Watts, M.B.E., M.Inst.C.E., F.R.Ae.S. (Airscrew Co., Ltd., Member of Council).
His Excellency Mr. John Winant (Ambassador of the United States of America).
Mr. L. A. Wingfield, M.C., D.F.C., A.R.Ae.S. (Solicitor of the Society).
Mr. R. T. Youngman, B.Sc., F.R.Ae.S. (Fairey Aviation, Ltd., Member of Council).

REVIEWS.

Introduction to Sea and Air Navigation.

By Prof. W. M. Smart. Longmans, Green and Co. 1942. 5/-.

This book, written by the Regius Professor of Astronomy at Glasgow University, whose " Foundations of Astronomy " was recently reviewed in the Journal, comes as a welcome change from the spate of " Technique-without-Tears " publications intended for young pilots and A.T.C. cadets, in which the mental age of the reader is assumed as something between seven and fourteen years. Professor Smart states in his preface that " the mathematical equipment expected of the reader does not extend beyond a knowledge of the simple trigonometrical functions, a brief summary of which is given in the Appendix," but any man who starts upon it with only an elementary knowledge of trigonometry will find it stiff reading. Used as a class text-book, however, under the supervision of a teacher, it should not be beyond the scope of R.A.F. trainees or of the older A.T.C. cadets. It does not deal with astro-navigation—upon which subject, we gather, a further volume is being prepared—but goes systematically through the other aspects of air and sea navigation; spherical geometry; position and direction; the Mercator Chart; dead reckoning; determination of position by observation and by wireless bearings; effect of tidal streams and waves (under which heading is included the effect of wind on an aeroplane). Each chapter is followed by a series of exercises, to which answers are given at the end of the book.

Sky Sweepers.

By Sergt. A. J. Wilson. Jarrolds. 1942. 7/6.

This account of Fighter Command's activities since the Battle of Britain is written with an abounding optimism—one might almost describe it as a bounding optimism—which makes it tonic reading. The enemy, referred to throughout as " the Hun," is, we gather, a poor type of fellow equipped with second-rate material. Any Hun who is so impertinent as to show his nose over Britain will either be " swatted like a fly " or sent scurrying homewards with ersatz oil spattering his windscreen. . . . We cannot help feeling that, if this were an exact picture of the situation, our Air Staff would be spared many headaches.

The most interesting part of the book, apart from anecdotes of the aces Bader, Malan and Finucane, and the less well-known Kingaby, Stevens and McKay, is contained in the last forty pages, entitled " The Battle of the Night Bomber," in which the author traces the successive steps by which the menace of the night raids was brought under control. The illustrations are official photographs, including one of the Knapsack Power Plant at Cologne in flames during a raid.

Flight to Arras.

By Antoine de Saint-Exupéry. (Translated by Lewis Galantière.) Wm. Heinemann, Ltd. 1942. 7/6.

To the connoisseur in aviation literature a new book by Saint Exupéry is like an Escoffier delicacy to the pre-war gourmet, or a Diaghileff ballet to the " high-brow " of the 1920's—something to be anticipated with whetted appetite, savoured with a lingering relish, and recalled with only one regret—that the pleasure of discovery lies in the past.

In " Flight to Arras " we have exchanged the scenic splendour of the Andes and the starlit sweep of the desert for the plains of Northern France, crammed with refugees, their villages " burning from Alsace to the sea." The whole action of the book takes only a few hours—the time to carry out a " mission sacrifiée " (which the translator in difficulties has somewhat oddly rendered as an " awkward sortie ") over Arras—yet in that short space Saint-Exupéry makes us relive with him the whole of his own life, the whole long agony of France: " Jammed roads, flaming houses, tools lying where they were flung down, villages in ruins, muddle, endless muddle." His account of the last days of the French campaign is one that will live. No Englishman who loves France could read it without a burning desire to give the German a taste of his own medicine. We would like to see these pages distributed to every bomber crew before they take off for Germany.

Apart from its historic significance, " Flight to Arras " contains the best analysis we have yet read of substratosphere flying and its effects, both physical and mental on the pilot. Even more interesting is the dissection of a Frenchman's reactions towards the defeat of his country. " Had France possessed the flavour of France, the radiation of France, the whole world would have been magnetised into a resistance of which the spearhead would have been France." Here, in the full welter of chaos and humiliation, we have the first voice foreshadowing the Fighting French of Bir Hakeim.

To get the fullest enjoyment from this book, the English version should be read, chapter by chapter, with the French. (" Pilote de Guerre," published by Editions de la Maison Française, New York). The two are not identical. Mr. Galantière seems to have translated from a manuscript version which has subsequently been revised. He has had a very difficult task and has acquitted himself well, but not so perfectly as in " Wind, Sand and Stars," which read like an original work. There are passages in the present book where the influence of the French construction is palpable, and we noticed one technical slip—" régler le pas de l'hélice " is surely to adjust the *pitch* of the propeller, not control its revolutions?